CLAIMS

1. Process for the preparation of a shaped part of an ultrahigh molecular weight polyethylene (UHMWPE) by heating the UHMWPE to a temperature above the melting temperature, shaping the resulting melt, and cooling the melt to a temperature below the melting temperature, wherein
   a) the UHMWPE has a weight average molecular weight (Mw) of at least $1 * 10^6$ g/mol,
   b) during the shaping the storage plateau modulus (G*) of the UHMWPE is kept at a value of at most 1.5 MPa,
   c) whereafter, before the cooling, the G* is raised to its final value.
2. Process according to claim 1, wherein Θ is at most 1 K/minute, as of a temperature of 350K.
3. Process according to claim 2, wherein the heating rate Θ is at most 5 K/minute.
4. Process according to claim 2, wherein the MWD is between and inclusive 1.2 – 3.0.
5. Process according to anyone of claims 1-3, wherein the initial value of G* is at most 0.75 MPa.
6. Process according to anyone of claims 1-5, wherein G* builds up to a value of 1.5 MPa at a speed (Ψ) less than 3 MPa/hour.
7. Process according to claim 6, wherein Ψ is less than 0.5 MPa/hour.
8. Process according to anyone of claims 1-7, wherein the UHMWPE is obtained through a solution or suspension polymerization at a temperature of between 225 and 325 K, using an unsupported catalyst in a concentration of less than $1*10^{-4}$ mol/L.
9. Process according to anyone of claims 1-8, wherein the UHMWPE is either a homopolymer of ethylene, or a copolymer of ethylene with another α-olefin or cyclic olefin.
10. Process according to claim 8, wherein the polymerisation takes place at a temperature between and inclusive 260 and 305 K.

11. Process according to anyone of claims 1-10, wherein the UHMWPE is annealed during the heating, at a temperature of not less than 398 K and not more than 410 K.

12. Shaped part, obtainable with a process according to anyone of claims 1-11.

13. Use of a shaped part, prepared according to anyone of claims 1-12, in a medical application.

14. Use according to claim 13, wherein the shaped part is an element of a hip or knee prosthesis.